

WHAT IS CLAIMED IS:

1. An isolated antibody that specifically binds to an amino acid sequence depicted at SEQ ID NO:1, or an immunogenic fragment thereof.
- 5 2. The antibody of claim 1 wherein the antibody is a monoclonal antibody.
3. The antibody of claim 1 wherein the antibody is a polyclonal antibody.
- 10 4. The antibody of claim 1 wherein the antibody is a humanized antibody.
5. The antibody of claim 1 wherein the antibody is covalently attached to a compound.
- 15 6. The antibody of claim 5 wherein the compound is a chemotherapeutic agent.
7. The antibody of claim 5 wherein the compound is a detectable marker.
- 20 8. The antibody of claim 7 wherein the detectable marker is a fluorescent marker.
9. The antibody of claim 1 wherein the antibody specifically binds to an amino acid sequence depicted at amino acids 13-27 of SEQ ID NO:1.
- 25 10. A composition comprising an antibody of claim 1.
11. The composition of claim 10 further comprising a pharmaceutically acceptable carrier.
- 30 12. A method for making an antibody comprising administering to an animal a polypeptide comprising an amino acid sequence depicted at SEQ ID NO:1, or

an immunogenic fragment thereof, and isolating antibody from the animal, wherein the isolated antibody specifically binds to the amino acid sequence.

13. The method of claim 12 wherein the polypeptide or immunogenic subunit thereof is covalently attached to a carrier polypeptide.

14. The method of claim 12 wherein the isolating comprises obtaining from the animal a cell that produces the antibody, the method further comprising making a monoclonal-antibody producing hybridoma using the cell.

10

15. A polyclonal antibody produced by a method of claim 12.

16. A monoclonal antibody produced by a method of claim 14.

15 17. A cell comprising an exogenous coding region, wherein the coding region encodes a first polypeptide comprising SEQ ID NO:20 or a second polypeptide comprising an amino acid sequence having at least 90% identity to SEQ ID NO:20, wherein the second polypeptide has ER- α 36 activity.

20 18. The cell of claim 17 wherein the coding region is operably linked to a constitutive promoter.

19. The cell of claim 17 wherein the cell is a eukaryotic cell.

25 20. The cell of claim 17 wherein the cell is a prokaryotic cell.

21. A cell expressing an exogenous polypeptide, wherein the polypeptide comprises SEQ ID NO:20, or comprises an amino acid sequence having at least 90% identity to SEQ ID NO:20 and has ER- α 36 activity.

30

22. The cell of claim 21 wherein the coding region is operably linked to a constitutive promoter.

23. The cell of claim 21 wherein the cell is a eukaryotic cell.
24. The cell of claim 21 wherein the cell is a prokaryotic cell.
- 5 25. A method for identifying an agent that binds a polypeptide, the method comprising:
- combining a polypeptide comprising an amino acid sequence depicted at SEQ ID NO:1 and an agent; and
- detecting the formation of a complex between the agent and the
- 10 polypeptide.
26. The method of claim 25 wherein the binding of the agent to the polypeptide is detected by a method selected from the group consisting of directly detecting the binding of the agent to the polypeptide and detecting the
- 15 binding of the agent to the polypeptide using a competition binding assay.
27. The method of claim 25 further comprising determining whether the agent binds a polypeptide comprising SEQ ID NO:18.
- 20 28. The method of claim 25 further comprising determining whether the agent inhibits ER- α 36 activity of the polypeptide.
29. A method for detecting a polypeptide comprising:
- providing a cell;
- 25 analyzing the cell for a polypeptide having ER- α 36 activity and a molecular weight of 36 kDa as measured following electrophoresis on a sodium dodecyl sulfate (SDS)-polyacrylamide gel; and
- determining whether the cell expresses the polypeptide.
- 30 30. The method of claim 29 wherein the cell is *ex vivo*.
31. The method of claim 30 wherein the cell is a tumor cell.

32. The method of claim 31 wherein the tumor is a breast tumor.
33. The method of claim 29 wherein the cell is *in vivo*.
- 5 34. The method of claim 30 wherein the cell is a tumor cell.
35. The method of claim 31 wherein the tumor is a breast tumor.
36. The method of claim 29 wherein the analyzing comprises contacting the
10 cell with an antibody that specifically binds to an amino acid sequence depicted at SEQ ID NO:1, or an immunogenic fragment thereof.
37. The method of claim 36 wherein the antibody is covalently attached to a detectable marker.
- 15 38. The antibody of claim 37 wherein the detectable marker is a fluorescent marker.
39. The method of claim 29 wherein the analyzing comprises amplifying an
20 mRNA polynucleotide to form amplified polynucleotides, wherein the amplification comprises contacting polynucleotides obtained from the cell with a primer pair that will amplify an mRNA polynucleotide that comprises SEQ ID NO:22 or SEQ ID NO:25, or the combination thereof, wherein the presence of amplified polynucleotides indicates the cell expresses the polypeptide.
- 25 40. The method of claim 39 wherein one primer of the primer pair is chosen from nucleotides of SEQ ID NO:22, nucleotides complementary to nucleotides of SEQ ID NO:25, or the combination thereof, and wherein each primer has at least 15 nucleotides.
- 30 41. A method for inhibiting ER- α 36 activity of a cell comprising contacting a cell expressing a polypeptide comprising an amino acid sequence depicted at

amino acids 13-27 of SEQ ID NO:1 with a compound that inhibits ER- α 36 activity.

42. The method of claim 41 wherein the compound comprises an antibody
5 that specifically binds to a polypeptide comprising an amino acid sequence depicted at amino acids 13-27 of SEQ ID NO:1.

43. The method of claim 41 wherein the cell is *in vivo*.

10 44. The method of claim 41 wherein the cell is ER- α 66 negative.

45. The method of claim 41 wherein the cell is ER- α 46 negative.

46. The method of claim 41 wherein the compound is not an anti-estrogen.

15

47. An isolated polypeptide comprising an amino acid sequence depicted at amino acids 13-27 of SEQ ID NO:1.

48. The isolated polypeptide of claim 47 further comprising amino acids 1-
20 12 of SEQ ID NO:1.

49. The isolated polypeptide of claim 48 further comprising an amino acid sequence depicted at SEQ ID NO:20.

25 50. An isolated polynucleotide having at least 70% identity to SEQ ID NO:20, wherein the polypeptide has ER- α 36 activity.

51. An immunogenic fragment of SEQ ID NO:1.

30 52. A kit comprising an isolated antibody that specifically binds to an amino acid sequence depicted at SEQ ID NO:1 and a packaging material.